Shallow fracture formation and fluid mobilization during diagenetically driven deformation: the Tertiary Badlands chalcedony vein and clastic dike systems of South Dakota and Nebraska.
Update 2011

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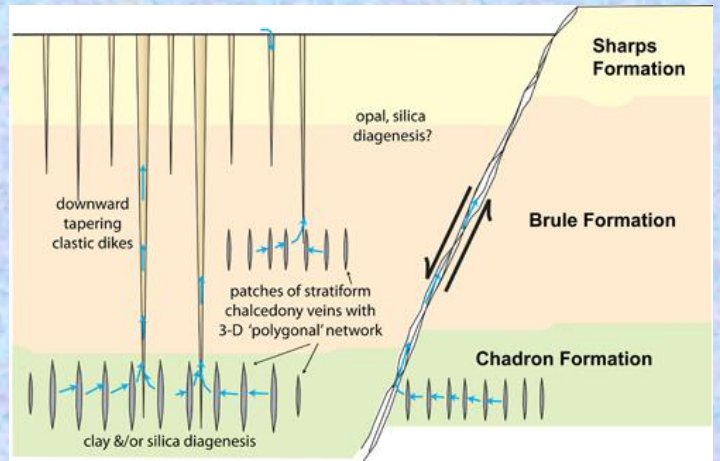
Investigating fractures at Courthouse Rock, Nebraska in 2011.

Project goals:

a) To provide students with formative undergraduate research experiences.

b) To investigate how fracture systems may be developed by changes in sediment during shallow burial.



initial model

Project significance:

Contributes to STEM education, and geology major recruitment and retention.

Contributes to understanding fracture systems, which in turn is important in petroleum geology, hydrogeology and structural geology.

Students by clastic dikes with green alteration zones, Cedar Pass, Badlands National Park.

Collecting samples in the field.

Fractures with strong tip curls.

Products to date:

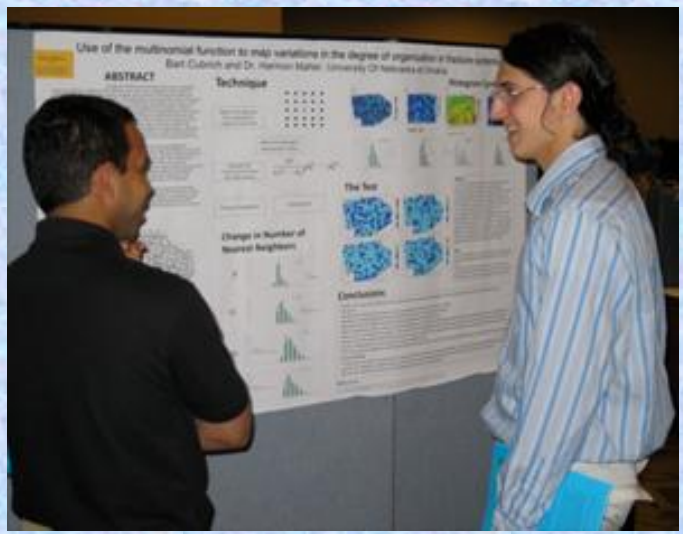
-16 undergraduate participants supported to date.

- 5 presentations at professional meetings (4 by students).

- 4 senior theses completed, with all 3 authors accepted into graduate programs .

- 2 senior theses in progress.

Student in the field from 2011 season



Student presentation at Geological Society of America meeting.

Progress to date continued:

- 7 new field sites mapped and sampled.

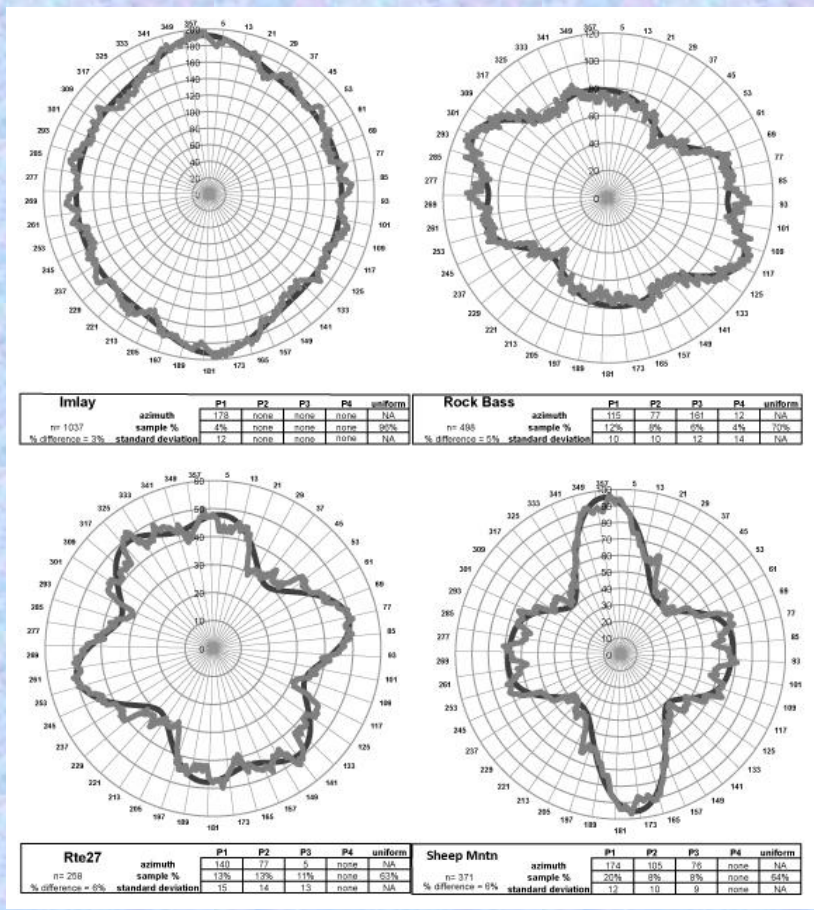
- GIS data base of chalcedony vein and clastic dike orientations expanded.

- new method for visualizing spatial variation in degree of strike organization developed.

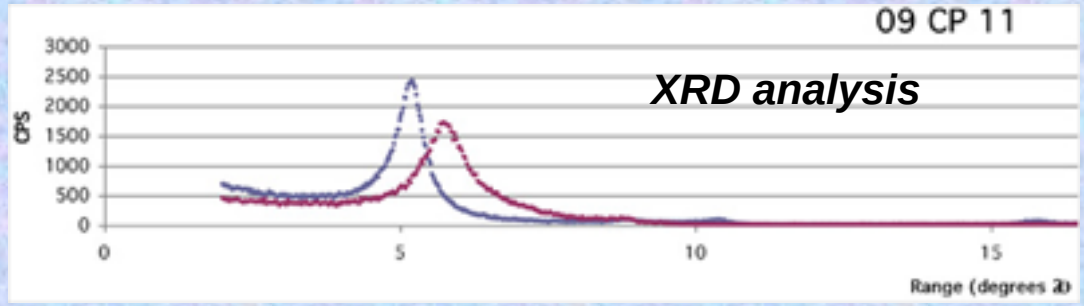
- expanded and data informed model for how these fracture systems form.

- one manuscript published, two in prep.

- smectite-illite anomaly detected in association with chalcedony horizons.



Above: Raw plots and models of chalcedony vein strike distributions, with sites that vary from unorganized to partly organized.



More to come!